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(54) Adjustable snap away fastener.

(57) The deployable door (D) of a passenger-side vehicle airbag restraint system is simultaneously fastened into an instrument panel opening and into engagement with the airbag module reaction canister. A spring clip (14) on the canister receives a probe (26) which is secured to the door through a pivoted breakaway connection (24,28). The probe is easily inserted into the clip (14) but can be withdrawn only with difficulty. Airbag inflation thereafter separates the breakaway connection preferentially to the spring clip connection.

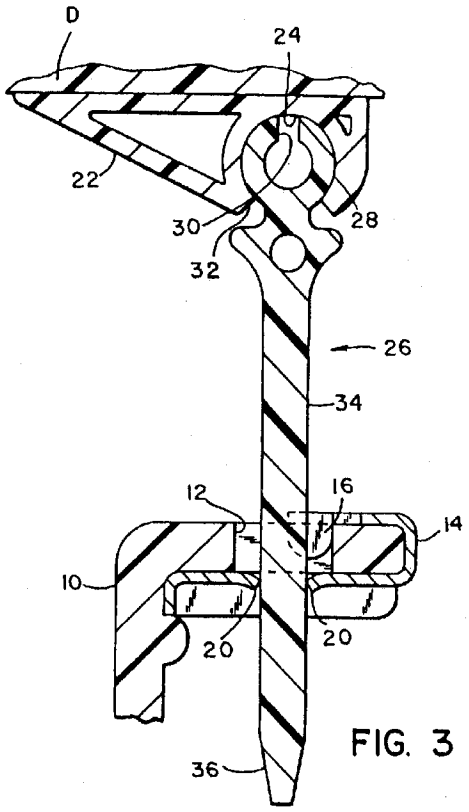

FIG. 3

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This invention relates to the field of automotive airbag restraint systems. More particularly, it relates to the interconnection between the airbag reaction canister and the airbag deployment door of the instrument panel.

In passenger side airbag restraint systems, the airbag reaction canister is mounted behind the vehicle's instrument panel. A portion of the instrument panel forms a deployment door which is designed to break away under the influence of the inflating airbag. It is crucial to the airbag operation that the door completely separates from the instrument panel and moves out of the way of the inflating bag. However, it is also important that the door fit snugly into the instrument panel so as to present an aesthetically pleasing appearance.

It has been difficult to achieve these objectives during the vehicle assembly or upon airbag replacement. This has been due to the fact that the snap fastening means required relatively precise positioning to assure proper alignment of the door. Accordingly, it is a primary object of the present invention to provide a snap fastening system which permits substantial flexibility between a connector on the reaction can and a connector on the door but holds the door firmly in position on installation by the assembler. Another object is to permit the breakaway force to be varied for different installations. Other objects, features, and advantages will become apparent from the following description and the appended claims.

A system is provided for fastening an instrument panel deployment door of an automotive airbag restraint system simultaneously into the instrument panel opening and into engagement with the airbag module reaction canister. A spring clip is mounted on either the reaction canister or the deployment door. The clip defines an opening which is adapted to receive an elongated probe which is inserted therethrough. It is also resistant to subsequent withdrawal of the probe. A base member is mounted on the other of the canister and deployment door. An elongated probe has a first end which pivotally engages the base member. It is forcibly detachable therefrom. A second end of the probe member is adapted to enter the opening of the clip as the deployment door is positioned into the instrument panel opening.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings wherein:

FIG. **1** is an elevational view of an airbag module reaction canister and the instrument panel deployment door connected thereto;

FIG. **2** is an enlarged cross-section taken substantially along the line 2-2 of FIG. **1**; and

FIG. **3** is a cross-section taken substantially along the line 3-3 of FIG. **2**.

FIG. **1** illustrates a passenger side airbag module **M** including a reaction canister **C** to which is secured a deployable door **D** mounted in an opening of instrument panel **P**. A conventional tether **T** restrains movement of the door **D** upon airbag inflation. The construction of the snap away fastener of this invention is shown most clearly in FIGS. **2** and **3**. The reaction canister **C** includes a pair of L-shaped brackets **10** on opposite sides of the canister opening. Each includes a central opening **12**. A substantially U-shaped spring clip **14** is mounted on each of the brackets **10**. The spring clip **14** may be of a metal such as steel and includes an upper surface which engages the ends of the opening **12** by means of downwardly extending tabs **16**. The bottom leg of the spring clip **14** underlies the opening **12** and itself defines an opening **18** surrounded by serrated margins forming teeth **20**.

Mounted on the inner surface of the deployment door **D** are a pair of base members **22**. Alternatively, these members may be integral parts of the door **D**. The base members **22** are plastic and may be molded or extruded. Each defines a cylindrical socket **24**.

Each of the base members **22** on the deployment door **D** connects to a spring clip **14** on the reaction canister. They are interconnected by means of plastic probe members **26**. Each of the probe members **26** has at one end a cylindrical head **28** which is bifurcated by a slot **30**. As a result, the head **28** is sufficiently resilient to permit it to be passed through a slot **32** in the base member **22** and fit within the cylindrical socket **24** as shown in FIG. **3**. The body **34** of the probe member **26** is elongated and of rectangular cross-section and terminates in a tapered tip **36**.

During assembly, each of the probe members **26** is mounted in a respective base member **22** as illustrated in FIG. **3**. Due to the cylinder and socket construction, there is substantial freedom of movement so that the probe members **26** are not rigidly fixed relative to the door **D**. Accordingly, the door **D** is advanced into the opening in the instrument panel **P** and the plastic shank **34** of each probe member **26** is inserted into the opening **18** of one of the spring clips **14**. It will also be noted that the opening **18** is substantially longer than the width of the shank **34**. This creates still another degree of freedom. All the assembler need do is properly align the deployment door **D** with the instrument panel opening and push the door into position. This causes the shank **34** of each of the probe members **26** to advance into the opening **18** of the spring clip **14**, whereupon the teeth **20** are depressed inwardly as shown in FIG. **3**. As a result, when the door **D** is finally seated, probe members **26** are firmly engaged so that subsequent withdrawal of the shank **34** is extremely difficult. However, upon subsequent airbag inflation, the base members **22** detach from the cylindrical heads **28** of each of the probe members as shown by the dash-dot lines of FIG. **1**. One of the features of this invention is that the release force required to break away the deployment door **D** is easily adjustable by varying the length of the

cylindrical attachment between the probe members **26** and the base members **22**. One way of making such an adjustment is to simply vary the width of the probe members **26**. When these are extruded, the extension is simply cut at the proper intervals to form probe members of the desired widths.

Claims

1. A system for fastening an instrument panel deployment door (D) of an automotive airbag restraint system simultaneously into an opening in an instrument panel (P) and into engagement with an airbag module reaction canister (C) which comprises:

   a spring clip (14) mounted on one of said reaction canister and deployment door, said clip defining an opening (18) adapted to receive an elongated probe inserted therethrough but resistant to subsequent withdrawal of said probe;

   a base member (22) mounted to the other of said reaction canister and deployment door; and

   an elongated probe member (26) having a first end pivotally engaging said base member but forcibly detachable therefrom and a second end (36) adapted to enter the opening of said clip upon positioning of said deployment door into said instrument panel opening.

2. A system according to claim 1 wherein said spring clip (14) is mounted on said reaction canister (C).

3. A system according to claim 1 or claim 2 wherein one of said base member (22) and probe member (26) defines a substantially cylindrical socket (24) and the other carries a cylinder (28) enclosed by said socket.

4. A system according to claim 3 wherein the socket (24) is defined by said base member (22).

5. A system according to claim 3 or claim 4 wherein said cylinder is substantially hollow and bifurcated.

6. A system according to any preceding claim wherein the opening (18) in said spring clip is defined by at least one margin which is deformable by insertion of said elongated probe.

7. A system according to claim 6 wherein said margin is serrated (20).

8. An automotive airbag restraint system of the type including an airbag module reaction canister (C) positioned behind an instrument panel deployment door (D), characterized in that:

   at least one spring clip (14) is mounted on said reaction canister, said clip defining an opening (18) deformable upon insertion of an elongated probe (34) therethrough to resist subsequent withdrawal of said probe;

   at least one substantially cylindrical socket (24) carried by said deployment door; and

   an elongated locking member (26) having a first end defining a cylinder (28) seatable in said cylindrical socket and a second end (36) forming a probe insertable into the opening of said spring clip,

   whereby inflation of the airbag of said restraint system separates the cylinder (28) from the socket (24) and permits the door to deploy.

9. An airbag restraint system according to claim 8 wherein said cylinder (28) is substantially hollow and bifurcated.

10. An airbag restraint system according to claim 8 or claim 9 wherein said probe is made of plastics material.

11. An airbag restraint system according to any one of claims 8 to 10 wherein said spring clip is metal.

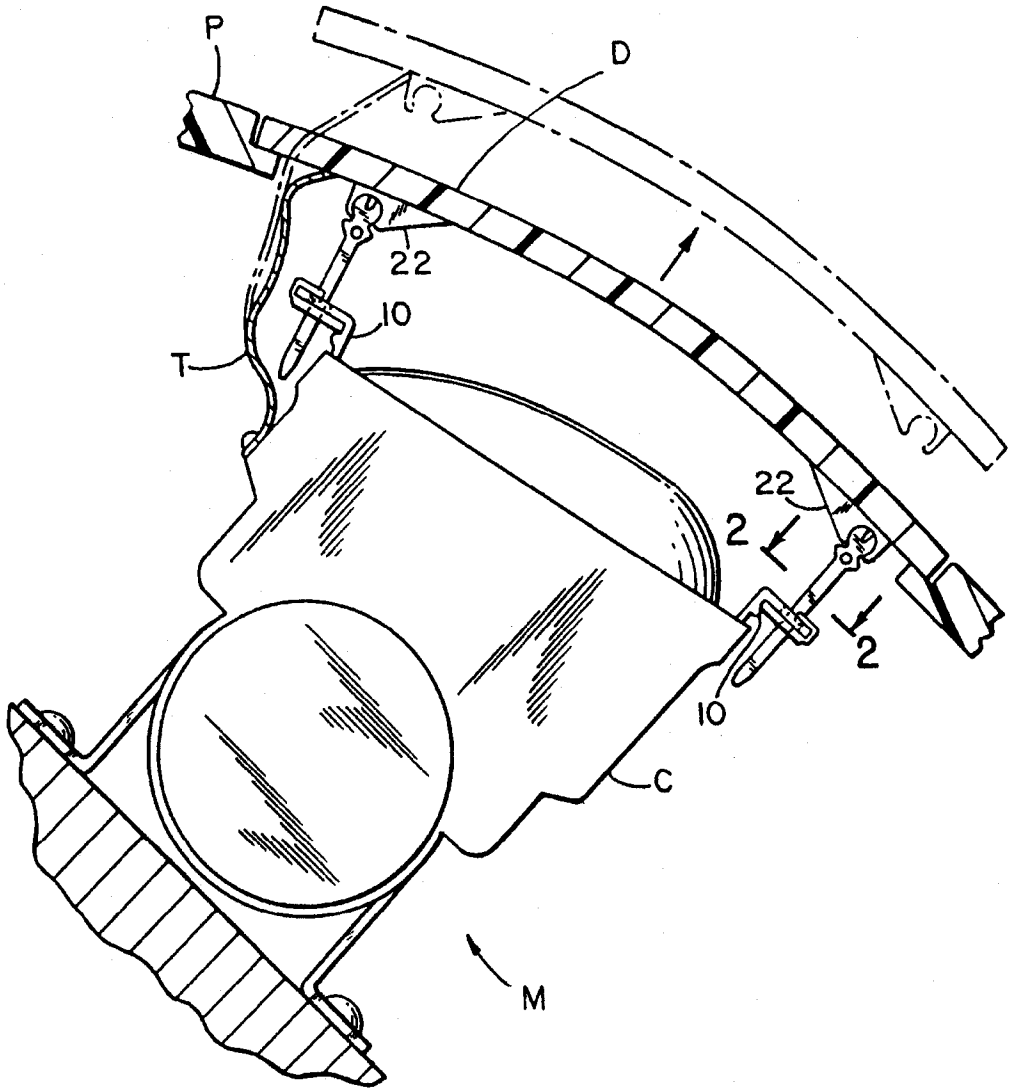

FIG. 1

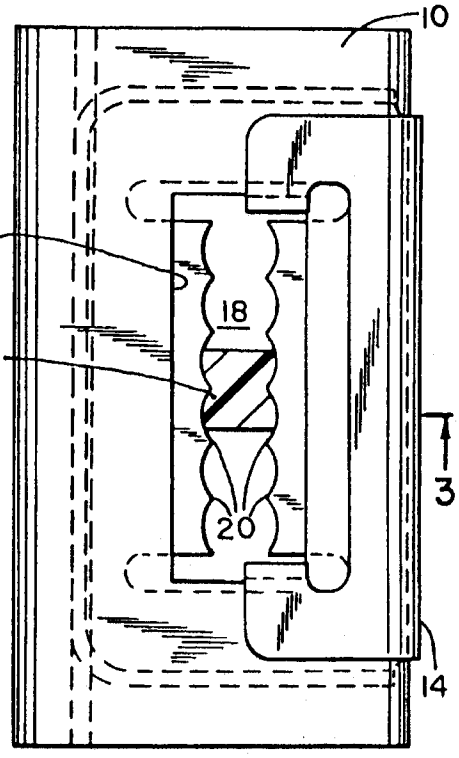

FIG. 2

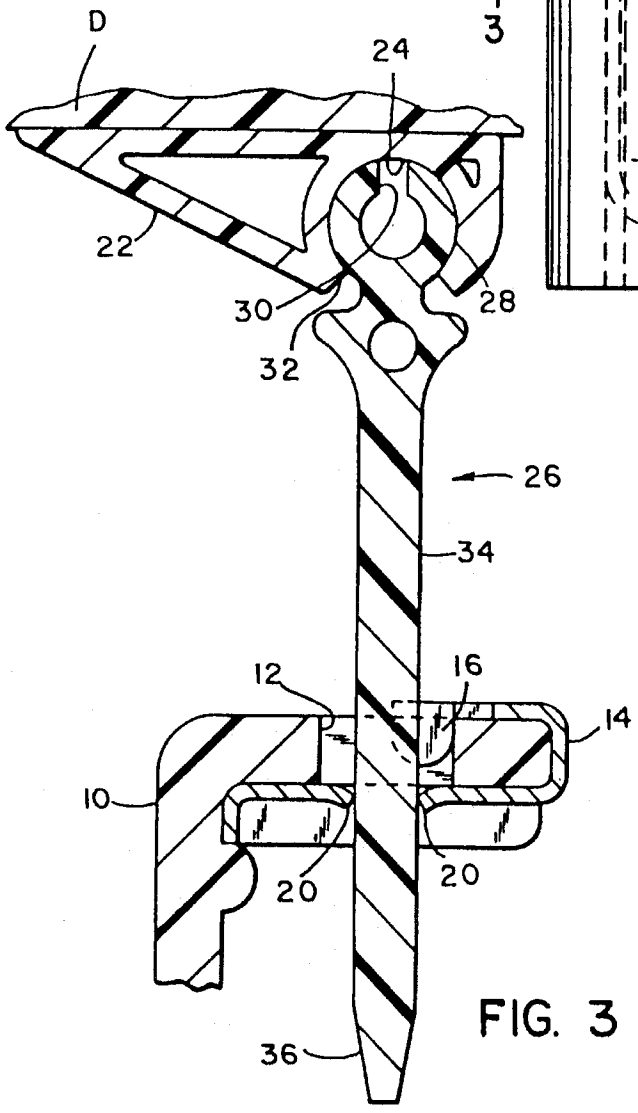

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 94 30 3872

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 17, no. 260 (M-1414) 21 May 1993 & JP-A-05 000 648 (MAZDA MOTOR CORP) 8 January 1993 * abstract *	1,2,8	B60R21/20 F16B21/20
A	US-A-5 211 421 (CATRON ET AL) * the whole document *	1,3,4,8	
A	EP-A-0 235 383 (PORSCHE AG) * column 3 - column 5; figures *	1,3,8	
A	FR-A-2 496 188 (ALFA ROMEO SPA) * the whole document *	1,6,7, 10,11	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B60R
F16B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 November 1994	Dubois, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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& : member of the same patent family, corresponding document

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US005458365A

United States Patent [19]

Rogers et al.

[11] Patent Number: 5,458,365

[45] Date of Patent: Oct. 17, 1995

[54] **ADJUSTABLE SNAP AWAY FASTENER**

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[21] Appl. No.: **101,187**

[22] Filed: **Aug. 3, 1993**

[51] **Int. Cl.**[6] **B60R 21/16**

[52] **U.S. Cl.** **280/728.3**; 280/732; 403/65; 403/150

[58] **Field of Search** ..... 280/728 B, 728 R, 280/731, 732; 403/65, 66, 68, 150; 411/174, 175, 537, 338, 339, 480, 923, 508, 509

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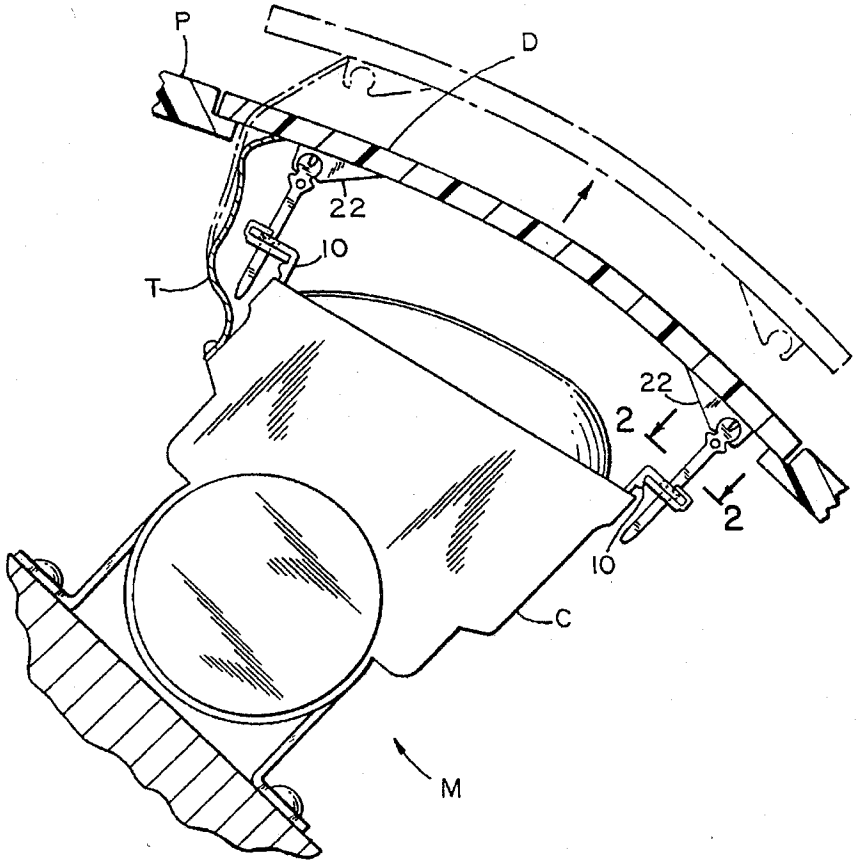
Primary Examiner—Eric D. Culbreth

Attorney, Agent, or Firm—George W. Rauchfuss, Jr.; Gerald K. White

[57] **ABSTRACT**

The deployable door of a passenger-side vehicle airbag restraint system is simultaneously fastened into an instrument panel opening and into engagement with the airbag module reaction canister. A spring clip on the canister receives a probe which is secured to the door through a pivoted breakaway connection. The probe is easily inserted into the clip but can be withdrawn only with difficulty. Airbag inflation thereafter separates the breakaway connection preferentially to the spring clip connection.

20 Claims, 2 Drawing Sheets



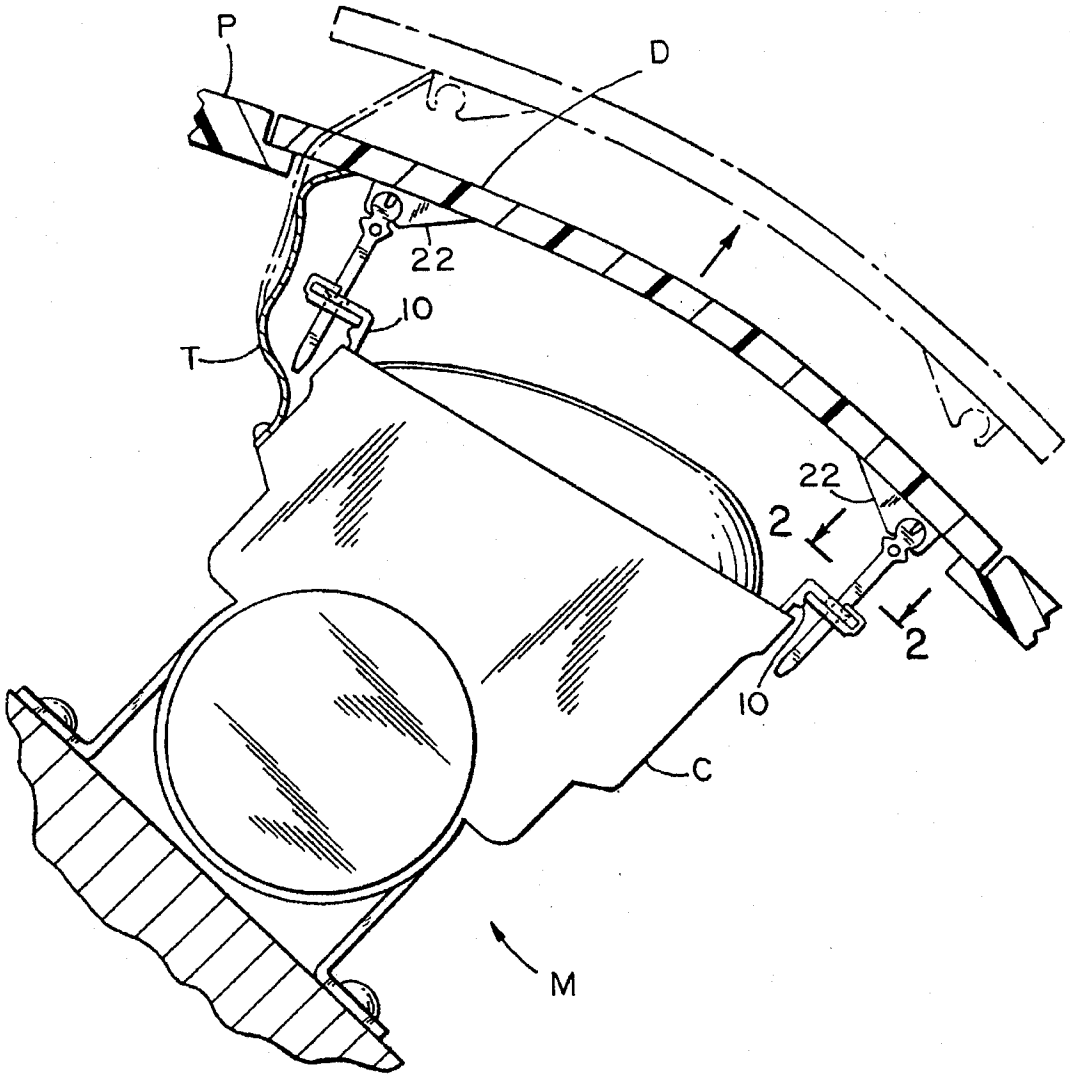


FIG. 1

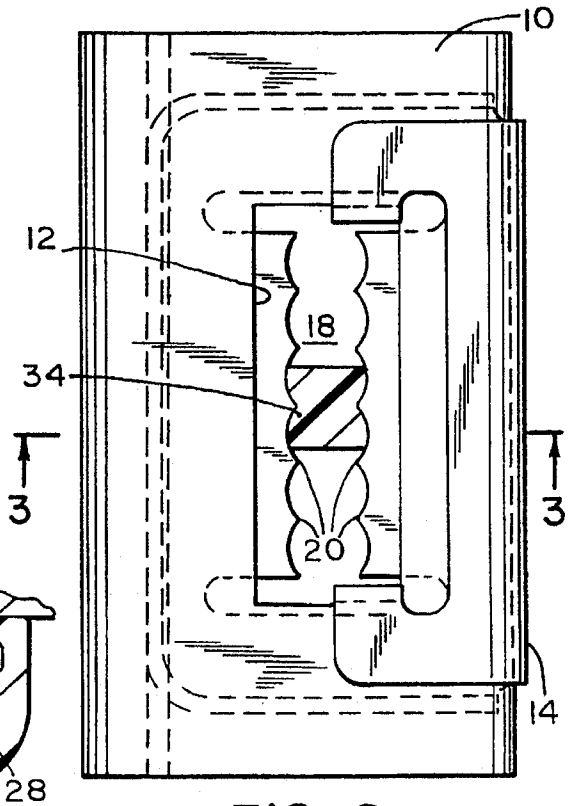


FIG. 2

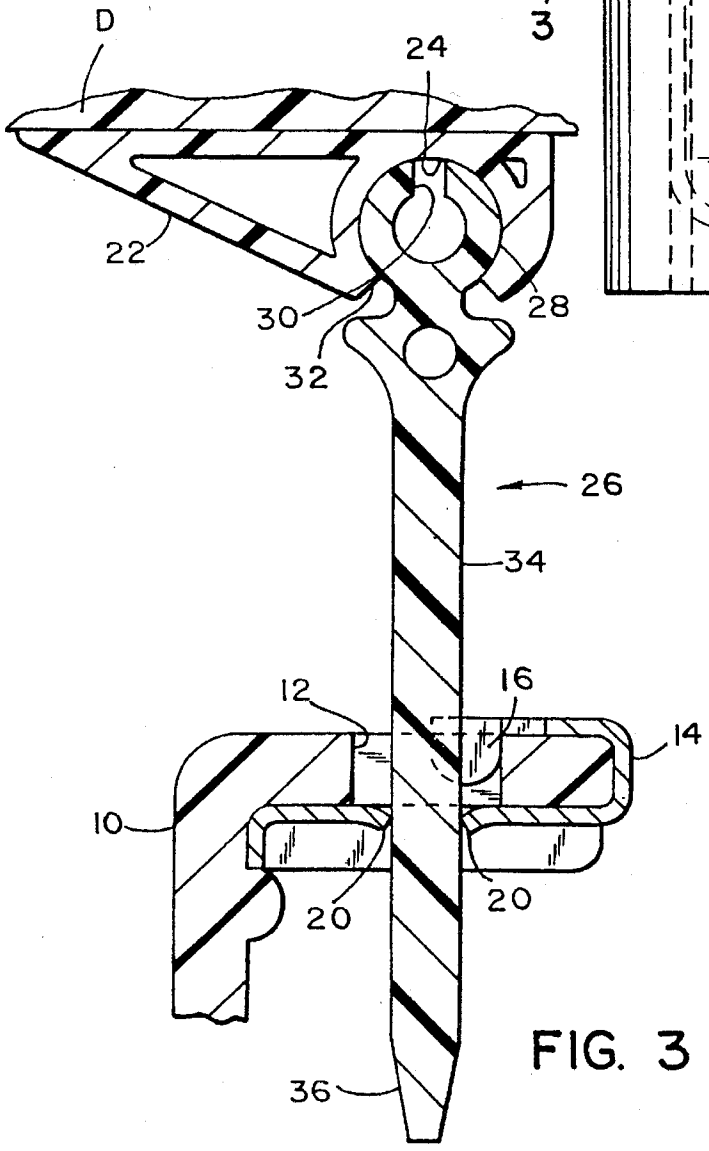


FIG. 3

ADJUSTABLE SNAP AWAY FASTENER

TECHNICAL FIELD

This invention relates to the field of automotive airbag restraint systems. More particularly, it relates to the interconnection between the airbag reaction canister and the airbag deployment door of the instrument panel.

BACKGROUND ART

In passenger side airbag restraint systems, the airbag reaction canister is mounted behind the vehicle's instrument panel. A portion of the instrument panel forms a deployment door which is designed to break away under the influence of the inflating airbag. It is crucial to the airbag operation that the door completely separates from the instrument panel and moves out of the way of the inflating bag. However, it is also important that the door fit snugly into the instrument panel so as to present an aesthetically pleasing appearance.

It has been difficult to achieve these objectives during the vehicle assembly or upon airbag replacement. This has been due to the fact that the snap fastening means required relatively precise positioning to assure proper alignment of the door. Accordingly, it is a primary object of the present invention to provide a snap fastening system which permits substantial flexibility between a connector on the reaction can and a connector on the door but holds the door firmly in position on installation by the assembler. Another object is to permit the breakaway force to be varied for different installations. Other objects, features, and advantages will become apparent from the following description and the appended claims.

DISCLOSURE OF INVENTION

A system is provided for fastening an instrument panel deployment door of an automotive airbag restraint system simultaneously into the instrument panel opening and into engagement with the airbag module reaction canister. A spring clip is mounted on either the reaction canister or the deployment door. The clip defines an opening which is adapted to receive an elongated probe which is inserted therethrough. It is also resistant to subsequent withdrawal of the probe. A base member is mounted on the other of the canister and deployment door. An elongated probe has a first end which pivotally engages the base member. It is forcibly detachable therefrom. A second end of the probe member is adapted to enter the opening of the clip as the deployment door is positioned into the instrument panel opening.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an elevational view of an airbag module reaction canister and the instrument panel deployment door connected thereto;

FIG. **2** is an enlarged cross-section takensubstantially along the line **2**—**2** of FIG. **1**; and

FIG. **3** is a cross-section taken substantially along the line **3**—**3** of FIG. **2**.

BEST MODE FOR CARRYING OUT THE INVENTION

FIG. **1** illustrates a passenger side airbag module M including a reaction canister C to which is secured a deployable door D mounted in an opening of instrument panel P. A conventional tether T restrains movement of the door D upon airbag inflation. The construction of the snap away fastener of this invention is shown most clearly in FIGS. **2** and **3**. The reaction canister C includes a pair of L-shaped brackets **10** on opposite sides of the canister opening. Each includes a central opening **12**. A substantially U-shaped spring clip **14** is mounted on each of the brackets **10**. The spring clip **14** may be of a metal such as steel and includes an upper surface which engages the ends of the opening **12** by means of downwardly extending tabs **16**. The bottom leg of the spring clip **14** underlies the opening **12** and itself defines an opening **18** surrounded by serrated margins forming teeth **20**.

Mounted on the inner surface of the deployment door D are a pair of base members **22**. Alternatively, these members may be integral parts of the door D. The base members **22** are plastic and may be molded or extruded. Each defines a cylindrical socket **24**.

Each of the base members **22** on the deployment door D connects to a spring clip **14** on the reaction canister. They are interconnected by means of plastic probe members **26**. Each of the probe members **26** has at one end a cylindrical head **28** which is substantially hollow and bifurcated by a slot **30**. As a result, the head **28** is sufficiently resilient to permit it to be passed through a slot **32** in the base member **22** and fit within the cylindrical socket **24** as shown in FIG. **3**. The body **34** of the probe member **26** is elongated and of rectangular cross-section and terminates in a tapered tip **36**.

During assembly, each of the probe members **26** is mounted in a respective base member **22** as illustrated in FIG. **3**. Due to the cylinder and socket construction, there is substantial freedom of movement so that the probe members **26** are not rigidly fixed relative to the door D. Accordingly, the door D is advanced into the opening in the instrument panel P and the plastic shank **34** of each probe member **26** is inserted into the opening **18** of one of the spring clips **14**. It will also be noted that the opening **18** is substantially longer than the width of the shank **34**. This creates still another degree of freedom. All the assembler need do is properly align the deployment door D with the instrument panel opening and push the door into position. This causes the shank **34** of each of the probe members **26** to advance into the opening **18** of the spring clip **14**, whereupon the teeth **20** are depressed inwardly as shown in FIG. **3**. As a result, when the door D is finally seated, probe members **26** are firmly engaged so that subsequent withdrawal of the shank **34** is extremely difficult. However, upon subsequent airbag inflation, the base members **22** detach from the cylindrical heads **28** of each of the probe members as shown by the dash-dot lines of FIG. **1**. One of the features of this invention is that the release force required to break away the deployment door D is easily adjustable by varying the length of the cylindrical attachment between the probe members **26** and the base members **22**. One way of making such an adjustment is to simply vary the width of the probe members **26**. When these are extruded, the extension is simply cut at the proper intervals to form probe members of the desired widths.

It is believed that the many advantages of this invention will now be apparent to those skilled in the art. It will also be apparent that a number of variations and modifications may be made therein without departing from its spirit and scope. Accordingly, the foregoing description is to be construed as illustrative only, rather than limiting. This invention is limited only by the scope of the following claims.

We claim:

1. A system for fastening an instrument panel deployment door of an automotive airbag restraint system simultaneously into an instrument panel opening and into engagement with an airbag containing-airbag module reaction canister which comprises:

a spring clip mounted on one of said reaction canister and deployment door, said clip defining an opening adapted to receive an elongated probe member inserted therethrough but resistant to subsequent withdrawal of said probe member upon airbag inflation;

a base member mounted to the other of said reaction canister and deployment door, said base member pivotally receiving an end of an elongated probe member; and

the elongated probe member having a first end pivotally engaging said base member but forcibly detachable therefrom upon subsequent airbag inflation and a second end received in the opening of said clip upon positioning of said deployment door into said instrument panel opening.

2. The system of claim **1** wherein said spring clip is mounted on said reaction canister.

3. The system of claim **2** wherein the opening in said spring clip is defined by at least one margin which is deformable by insertion of said elongated probe.

4. The system of claim **1** wherein one of said base member and probe member defines a substantially cylindrical socket and the other carries a cylinder enclosed by said socket.

5. The system of claim **4** wherein the opening in said spring clip is defined by at least one margin which is deformable by insertion of said elongated probe.

6. The system of claim **4** wherein said cylinder is substantially hollow and bifurcated.

7. The system of claim **4** wherein the socket is defined by said base member and the cylinder is defined by the first end of said elongated probe.

8. The system of claim **7** wherein the opening in said spring clip is defined by at least one margin which is deformable by insertion of said elongated probe.

9. The system of claim **8** wherein said margin is serrated.

10. The system of claim **8** wherein said cylinder is substantially hollow and bifurcated.

11. The system of claim **10** wherein said margin is serrated.

12. The system of claim **7** wherein said cylinder is substantially hollow and bifurcated.

13. In an automotive airbag restraint system including an airbag containing-airbag module reaction canister positioned behind an instrument panel deployment door, the improvement which comprises:

at least one spring clip mounted on said reaction canister, said clip defining an opening deformable upon insertion of an elongated probe therethrough to resist subsequent withdrawal of said probe upon inflation of the airbag;

at least one substantially cylindrical socket carried by said deployment door; and

an elongated locking member having a first end defining a bifurcated cylinder seated in said cylindrical socket and a second end forming an elongated probe received into the opening of said spring clip,

whereby, upon inflation of the airbag of said restraint system the bifurcated cylinder is separable from the socket to permit the instrument panel deployment door to deploy.

14. The improvement of claim **13** wherein said bifurcated cylinder is substantially hollow.

15. The improvement of claim **14** wherein said probe is plastic.

16. The improvement of claim **15** wherein said spring clip is metal.

17. A system for fastening an instrument panel deployment door of an automotive airbag restraint system into an instrument panel opening and into engagement with an airbag containing-airbag module reaction canister which comprises:

a spring clip mounted on said reaction canister, said clip defining an opening adapted to receive an elongated probe member inserted therethrough but resistant to subsequent withdrawal of said elongated probe member upon airbag inflation;

a base member mounted to said reaction deployment door; and

said spring clip and said base member being interconnected by an elongated probe member having a first end pivotally engaging said base member but forcibly detachable therefrom upon subsequent airbag inflation and a second end received in the opening of said clip.

18. The system of claim **17** wherein one of said base member and elongated probe member defines a substantially cylindrical socket and the other carries a cylinder enclosed by said socket.

19. The system of claim **18** wherein the socket is defined by said base member and the cylinder is defined by the first end of said elongated probe member.

20. The system of claim **19** wherein the opening in said spring clip is defined by a serrated margin which is deformable by insertion of said elongated probe member and the cylinder is substantially hollow and bifurcated.

* * * * *